

During hospitalization one of the subject's teeth was found to be loose and was extracted by the Dental Service.

CASE #101      year old male employed      The subject stated that following his LSD exposure he became somewhat more short-tempered, had difficulty concentrating, and was less motivated with respect to his job performance. It was not clear exactly how long this personality change persisted. However, the subject felt that it played some role in his decision to retire from the military 4 years later. Past medical history included chronic alcoholism, presently under control, and alcoholic polyneuropathy and pancreatitis. Additional reported illnesses include recurrent tension headaches, varicose veins, occasional chest pains, nocturnal leg cramps, gallbladder disease, and a mild memory defect. Physical examination was unremarkable with the exception of several well-healed scars from previous surgeries and evidence of peripheral neuropathy with findings of decreased vibratory sensation and hyporeflexia in both lower extremities. Routine laboratory studies were all within normal limits with the exception of slight elevation of uric acid and a mild abnormality of liver enzymes. ENT consultation showed a deviated nasal septum and a bilateral high frequency hearing loss. Psychiatric evaluation showed no current psychopathology.

CASE #102      year old male employed as an      The subject reported that he was involved in two separate drug experiments--one in 1957 and one in 1959. The subject reported that on one occasion after returning to his normal duty station following drug exposure, he became acutely disoriented and confused. This lasted approximately 2 weeks before gradually clearing. Two years later, in 1968, while serving in the Republic of Vietnam, the subject reported the onset of recurrent episodes of transient alterations of consciousness lasting from a few seconds to several minutes. During these episodes the subject became temporarily out of contact with his surroundings and his ongoing activities were interrupted. No convulsive activity was witnessed during these episodes. In addition, the subject reported a number of episodes in which he carried out relatively complex activities for which he subsequently had no memory. For example, the subject stated that he once found himself in New York City having apparently driven there in his car but being unable to remember any of the details of how or why he did so. The remainder of the subject's past medical history is unremarkable with the exception of experimentation with marijuana on a few occasions. Physical examination was unremarkable. Neurological examination was within normal limits with the exception of an unexpected degree of difficulty with calculations which appeared to be out of proportion for the patient's education and background. Laboratory studies including electroencephalography were all within normal limits. ENT and ophthalmology consultations showed no evidence of significant abnormalities. Psychiatric evaluation noted the history of recurrent dissociative episodes but entered no specific psychiatric diagnosis.



CASE #119      year old male currently employed as a  
The subject participated in chemical warfare experiments in 1959. The subject stated that although he had not experienced any specific LSD-related problems, he did feel that the LSD exposure had had a positive influence on him in that he "took life more seriously" for a number of years after this exposure. The subject's past medical history was unremarkable with the exception of recurrent tinnitus for the past several years associated with progressive hearing loss. The subject also stated that in the past few years he has had occasional episodes of lightheadedness and visual distortions when fatigued. Neither of these experiences resembles in any way the effects of his prior LSD exposure.

CASE #123      year old retired Army officer who participated in LSD testing in 1960. In 1963 the subject had an acute febrile illness with a temperature of 105 degrees Fahrenheit and was found unconscious. He remained unresponsive for several hours. The subject eventually regained consciousness and his fever gradually subsided over the next several days. No definite diagnosis was made at this time either of the nature of his febrile illness or the cause of his unresponsiveness. The subject remained asymptomatic until 1969 at which time he again had a sudden loss of consciousness and remained unresponsive for about 30 minutes. Again, no specific diagnosis was made. The subject has subsequently had two further episodes involving loss of consciousness, both lasting 5 to 10 minutes. In none of the episodes reported to date was there any specific evidence of seizure activity. The remainder of the subject's past medical history was unremarkable with the exception of removal of cysts from his left elbow and his right hip and a whiplash injury in 1961. The subject has experienced recurrent severe chest pain (associated on one occasion with loss of consciousness) but thorough cardiology evaluation has not demonstrated any specific cause for this pain. Physical examination was unremarkable with the exception of a small mass on the subject's chest in the left fifth intracostal space. Laboratory evaluation was completely within normal limits with the exception of an electroencephalogram which was interpreted as mildly abnormal because of bifrontal sharp wave activity. Radionuclide brain scan was completely normal. The subject was seen in consultation by the Surgery Service and the previously noted mass on the left chest wall was excised. It proved to be a benign lipoma. Because of the above history of repeated loss of consciousness and the finding of mild abnormalities on electroencephalography the subject was started on anti-convulsant medication prior to discharge and arrangements were made for repeat neurological examination.

CASE #128      year old active duty enlisted man who participated in LSD experimentation in 1963. The subject stated that immediately following his exposure to LSD he was significantly depressed for several days. However, following return to his duty station he was asymptomatic for approximately 12 months. About 1 year after the initial LSD exposure the subject began to experience a series of episodes characterized by feelings of suspiciousness, withdrawal, and the idea that "he was a super spy" who had to



keep important secrets. These episodes were strongly reminiscent of the feelings which the patient had experienced while under the influence of LSD. These episodes tended to be precipitated by drinking or by stress and recurred intermittently until about 1970. Since 1970 the subject has had no further episodes but according to information obtained during psychiatric evaluation he has "harbored a fear since the experiment that he had a glimpse of something terrible about himself that the experiment began to reveal, and a fear that in dreams or under times of stress he might discover further feelings of badness or worthlessness." General past medical history obtained during the period of hospitalization included allergic sinusitis, hiatal hernia associated with recurrent heartburn, and recurrent hemorrhoids. In addition, the subject stated that he had used marijuana socially on several occasions. Physical examination was unremarkable with the exception of mild obesity. Routine laboratory studies were likewise essentially within normal limits. Routine ENT consultation revealed a mild sensorineural hearing loss in the left ear for which no treatment was necessary.

CASE #139      year old male employed as a      Information obtained by questionnaire included the complaint of "bad memory" as a result of LSD exposure. When contacted by telephone the subject stated that he could not be more specific about the details of his memory loss which he was unable to describe beyond "just bad memory." The subject stated that although he could not precisely state the time of onset of this symptom, he believes it started after his exposure to chemical warfare agents. Past medical history as reported by questionnaire showed no significant illnesses.

CASE #140      year old male who participated in chemical warfare studies in 1966 and 1967. The subject stated that since his participation in chemical warfare experiments he has noted that the "pupils of (his) eyes dilate alot." He stated that he also was possibly more nervous following participation in chemical warfare experiments. In the subject's daily work he is frequently exposed to anhydrous ammonia and liquid nitrogen. The past medical history included head trauma with a possible concussion, hernia repair, and possible hypothyroidism. Physical examination was unremarkable with the exception of a small scar over the right eye and minimal crepitation on movement of the right knee. The subject was also noted to be moderately obese. Routine laboratory studies including ECG and EEG were all within normal limits with the exception of a marked elevation of serum triglycerides. Repeat evaluation of serum triglycerides confirmed this abnormality and the subject was instructed in the maintenance of a 1,200 calorie per day diet. Consultations with the ENT, Psychiatry, and Ophthalmology Services all failed to reveal any abnormalities. However, preliminary psychological testing showed some indication of depression and the subject was counseled to seek further evaluation should he develop any more overt symptoms of depressive illness.



CASE #141      year old male who participated in LSD experimentation in 1966. The subject stated that he had no signs or symptoms subsequent to LSD exposure until 1970 when he developed moderate depression characterized by a flattened affect, loss of appetite, and crying spells. The subject stated that he feels that these symptoms might have been related to LSD exposure 4 years before. In 1974, the patient had a "reaction" in which he mistook his girl friend for another person whom he claimed to have met during chemical warfare experimentation. Past medical history included mild muscle spasms associated with a motor vehicle accident and the removal of a benign gingival tumor in 1977. The subject also complained of rashes in the groin and on the plantar surface of his toes for several months. Physical examination was unremarkable with the exception of a rash in the groin area and fallen arches bilaterally. Routine laboratory studies including electrocardiography and electroencephalography were all within normal limits. Ophthalmology and ENT consultations revealed no abnormalities. Psychiatric evaluation showed evidence of a depressive neurosis and mixed personality disorder and recommended that the subject be entered into treatment at a local mental health clinic. Dermatology examination revealed tinea cruris and treatment was begun.

CASE #142      year old male      Information obtained by questionnaire indicated that during periods of stress and fatigue the subject has experienced a "near return to the panic feeling experienced during LSD experiments." The subject stated that he has been able to overcome this panicky feeling only by "sheer will-power." The subject stated that as a result of his participation in chemical warfare experiments he has "lost a lot of my stamina." Past medical history as reported by questionnaire includes chronic essential hypertension, early emphysema, and gout. The subject also reported multiple additional complaints including neck lumps, worsening eyesight, buzzing in his ears, recurrent sneezing spells, recurrent coughing, chest pains, a heart murmur, heartburn, loose stools, rectal bleeding, aching joints, difficulty in making decisions, loss of concentration, depression, extensive worrying, frightening dreams, dislike of criticism, a quick temper, easy annoyance by little things, and excessive fatigue.

CASE #149      year old male. Information obtained by questionnaire indicated that the subject had multiple symptoms which he attributed to prior LSD exposure. These symptoms included severe headaches, blurred vision, intermittent chest pain, "moodiness," nightmares, "bad cough," "hard breathing with sinus congestion all the time," "lost memories," and "doesn't always hear." The subject declined to participate in the follow-up examination out of "the fear (he) would be used again for test of some sort or be doped and sign papers releasing the Army for these problems."

CASE #172      year old male who received chemical warfare agents in 1963. Information obtained by questionnaire and by telephone contact indicated



that the subject has experienced vague weakness for the past 4-5 years and wondered if this weakness could have been caused by exposure to chemical warfare agents 16 years previously. He has never experienced any other symptoms referable to possible LSD exposure. The subject's past medical history was unremarkable except for occasional nosebleeds, chest pain (non-cardiac), sinusitis and hemorrhoids.

CASE #173 The subject is a      year old male who participated in chemical warfare testing in 1958. The subject stated that for the past few years he has noticed some difficulty with his memory and "wondered" if having taken LSD could have caused this. Otherwise, the subject has had no signs or symptoms of any sort which he can relate to LSD exposure. Past medical history included one week's hospitalization in 1966 for food poisoning, chronic recurrent hemorrhoids, recurrent low back pain, and recurrent inner ear problems with secondary vertigo and nausea. Physical examination was unremarkable with the exception of slow, stiff movements secondary to chronic low back pain. Routine laboratory studies were all within normal limits. Lumbar spine x-rays showed marked osteophytic spurring compatible with degenerative joint disease. Consultations from the Ophthalmology and Psychiatry Services showed no abnormalities. ENT consultation showed a mild high frequency hearing loss.

CASE #181 The subject is a      year old male who participated in chemical warfare experimentation in 1957. The patient stated that at the present time he feels that there is something wrong with his "nervous system," that this problem has been present for the past 18 to 24 months, and is "possibly due to LSD." More specifically, the subject described insomnia and periods of depression. The depression was apparently aggravated by increased alcohol consumption until about 4 months prior to participation in the follow-up study. The subject also stated that his "nerves are shot" and his "whole body shakes." The subject stated that none of these symptoms were present prior to 2 years ago (20 years after a single LSD exposure) and that in the past 2 years he has become separated from his wife and has gone through bankruptcy proceedings. Past medical history is unremarkable with the exception of chronic thyroid disease which is also present in two of his siblings. Physical examination was within normal limits with the exception of a well-healed scar over the right eye and tattoos on both arms. Neurological examination showed no specific abnormalities. All laboratory studies were within normal limits including thyroid function tests. Ophthalmology consultation showed no abnormalities. ENT consultation showed a minimal high frequency hearing loss. Psychiatric evaluation showed an adjustment reaction of adult life associated with depression and habitual excessive drinking.

CASE #184 The subject is a      year old male who participated in chemical warfare experiments in 1966 and in 1967. The patient stated that in 1966 he was given LSD via inhalation from an aerosol spray. He stated that since



that time he has experienced mild, persistent shortness of breath which is only noticeable on moderate exercise. At the present time the subject runs a cabinet shop and is continuously exposed to paint fumes and vapors. The past medical history includes a 35-pack/year history of cigarette smoking and possible gout. Physical and neurological examinations were unremarkable. Laboratory studies revealed a slight elevation of serum triglycerides and a mild elevation of serum lactic acid dehydrogenase. Chest x-ray at the time of admission showed a density overlying the left seventh rib. Although this lesion appeared to be benign, further studies were recommended for more precise localization. Pulmonary function testing was obtained and revealed reduced diffusion which was felt to be compatible with chronic cigarette smoking. Psychiatric evaluation showed no evidence of abnormalities. ENT examination showed a mild bilateral high frequency hearing loss. Ophthalmology examinations showed myopia and benign cobblestone degeneration in the right eye.

CASE #202      year old active duty non-commissioned officer who participated in LSD experiments in 1967. Following his LSD exposure he had no particular residual signs or symptoms until approximately 6 to 8 months later while on combat duty in the Republic of Vietnam. At this time his commanding officer had apparently noted a change in the subject's personality with increasing restlessness, tension, and irritability. In 1969 he experienced a "flashback." While mopping a floor, he hallucinated the strands of the mop becoming elongated and wrapping themselves around his feet and ankles anchoring him to the floor. There have been no subsequent flashback experiences. The patient reported that also in 1969 he began to experience severe marital difficulties because of his "personality change." This culminated in separation from his wife, the subject became severely depressed with suicidal ideation and began having violent nightmares. In addition, he reported occasional auditory and visual hallucinations of a frightening nature. These, however, were not reminiscent of his LSD experiences. Additional past medical history included increased alcohol intake over the past 10 years, frequent recurrent headaches, noise-induced hearing loss with tinnitus, hemorrhoids, and occasional elevated blood pressure. Physical examination was unremarkable with the exception of borderline high blood pressure. Neurological examination showed constructional apraxia and a fine rapid tremor of both upper extremities which increased in amplitude on finger to nose maneuvers. Routine laboratory studies were all within normal limits with the exception of a slight elevation of liver enzymes. ENT evaluation showed an asymptomatic nasal septal deformity but did not confirm significant hearing loss. Cardiology evaluation was obtained because of a history of chest pain during sexual intercourse but no significant abnormalities were found. During hospitalization the patient developed severe temporomandibular joint pain on the left and was referred to the Oral Surgery Service. No significant abnormalities were found and analgesic medications were prescribed. Psychiatric evaluation



showed severe anxiety neurosis with considerable paranoid ideation, anxiety, and hypochondriasis. The examining psychiatrist felt that many of the patient's symptoms, particularly a history of recent onset of visual and auditory hallucinations, suggested a pre-psychotic process and that further psychiatric evaluation was mandatory. Arrangements were therefore made for the patient to be admitted to psychiatric treatment on return to his normal duty station.

CASE #211 The subject is a      year old male who participated in LSD testing in 1959. Subsequent to LSD exposure the patient has had no specific signs or symptoms. However, he stated that he occasionally has a sensation of extreme fatigue which is reminiscent of how he felt immediately after LSD exposure. Past medical history showed recurrent low back pain, recurrent arthritis, and abnormal liver function studies 1 year prior to LSD follow-up. Physical examination was unremarkable with the exception of a slightly enlarged prostate. Laboratory studies were all within normal limits with the exception of a borderline elevation of lactic acid dehydrogenase and a significantly elevated CPK. The repeat CPK with isoenzyme fractionation was obtained but the results were not available at the time of discharge. Ophthalmology, ENT, audiology, and psychiatric consultations were all within normal limits. At the time of discharge the subject was instructed to obtain repeat CPK evaluation in 1 month and also informed that the results of the pending CPK evaluation would be forwarded to him when available.

CASE #222 The subject is a      year old male who participated in chemical warfare experiments in 1957. For 3 days after the initial injection of a substance presumed to be LSD, the subject experienced marked lapses of memory. During these 3 days he frequently carried out complex activity, such as driving to another town, only to suddenly be unable to recall how or why he had arrived at his destination. These symptoms resolved within 96 hours of the initial exposure to LSD. Through the next 4 years the subject experienced periodic episodes of depression and in 1961 the subject became severely depressed and contemplated suicide. He was about to jump from a bridge when he was stopped by a stranger and taken to a hospital where he remained under psychiatric care for 1 week. Since that time he has had no further episodes of depression or any other signs or symptoms which could be attributed to LSD exposure. Past medical history included appendectomy, tonsillectomy, hemorrhoidectomy, and knee cartilage surgery. In addition, the subject gave a history of having been knocked unconscious several times during boxing matches. Physical examination was unremarkable. All screening laboratory studies were within normal limits with the exception of chest x-ray which showed mild degenerative changes of the thoracic spine. Consultations with the ENT and Ophthalmology Services were normal. Psychiatric interview showed no presence of psychiatric problems although the previous history of severe depression was noted.







CASE #237      year old male retired Army officer. The subject reported prolonged depression following LSD exposure which lasted for approximately 12 months. Although the subject has never experienced any additional difficulties which he could attribute to his LSD exposure, he did raise the issue of infertility. The subject has one child, born in 1956, and since that time he and his wife have been unable to have additional children despite the desire and attempt to do so. During hospitalization the subject underwent chromosomal analysis which showed no abnormalities and semen analysis which likewise was completely within normal limits. The subject's general past medical history was unremarkable with the exception of chronic essential hypertension and diffuse arthritis. The general physical examination was unremarkable with the exception of mild exogenous obesity and a grade I/IV systolic ejection murmur. Laboratory examination was likewise unremarkable with the exception of elevation of serum cholesterol and triglycerides. Because of a family history of diabetes a 2-hour post prandial was obtained and proved to be within normal limits.

CASE #244      year old male who participated in chemical warfare experiments in 1964. Over the next 3 years the subject had occasional episodes of brief, transient depression. About 3 years after LSD exposure the subject experienced an acute severe depression including feelings of "not caring for anything and not being able to control myself." The subject stated that at the time of onset of these symptoms he was driving his car and became afraid that he would become unable to control the vehicle. He stopped the car and began walking into some nearby woods where he remained for approximately 40 minutes. At the end of this period of time the depression resolved and he returned to his usual state of functioning. Subsequent to this episode the subject has had no further signs or symptoms of any kind which were reminiscent of his LSD experience. Past medical history was unremarkable. Physical examination showed no significant abnormalities. Routine laboratory studies were all within normal limits with the exception of the chest x-ray which showed a slight interstitial fibrosis near the left costophrenic angle. There also were scattered granulomata but no other abnormalities. Routine consultations with the Ophthalmology, ENT and Psychiatry Services showed no abnormalities.

CASE #255      year old male who participated in chemical warfare experiments in 1959. One week following his exposure to LSD the subject experienced a brief (less than 5 minutes) recurrence of his LSD experience. Subsequent to this episode, the subject experienced no other signs or symptoms of any kind referable to LSD exposure. Past medical history was unremarkable. Physical examination showed only several patches of vitiligo on the right hand. Routine laboratory studies revealed a mild microcytic anemia of unknown etiology and a calcified lymph node in the right hilar area on chest x-rays. Consultations with Ophthalmology, Psychiatry and Psychology Services showed no abnormalities. ENT evaluation showed a bilateral high frequency hearing loss.



CASE #256      year old male unemployed      This subject stated that subsequent to his LSD exposure in 1958 he underwent a personality change becoming much more aggressive. Periodic violent outbursts began to occur. Specifically, the subject stated that he had beaten every woman with whom he had been involved in a love relationship and had been involved in numerous barroom brawls. Psychiatric interview revealed that the subject was the product of a broken home and had lived with his father from the age of 13 years. Two years prior to LSD exposure the subject received a court martial for unauthorized use of a pass and was reduced in rank. Past medical history obtained during hospitalization included one episode of gonorrhea, habitual excessive alcohol intake, mild hepatic dysfunction, probably secondary to alcohol, and a hiatal hernia treated with antacids. Physical examination was unremarkable. Laboratory screening studies showed a borderline abnormality of serum bilirubin and a slight elevation of alkaline phosphatase (liver enzyme). ENT showed a nasal septal defect. Although no specific diagnosis was entertained on psychiatric evaluation, further psychiatric study and possibly treatment was recommended.

CASE #257      year old male      Information obtained by questionnaire indicated that in the period immediately following participation in LSD testing the subject experienced "flashbacks" and "periods of great loneliness and depression." The subject stated that as a result of his abnormal emotional state he suffered marital disruption and acted in a financially irresponsible manner causing credit problems which have persisted to the present time. General medical information reported by questionnaire includes history of allergies, rheumatoid arthritis, and a hernia (type unknown). The subject also reported being hospitalized in the past year for stomach pains and having occasional rectal bleeding.

CASE #270      year old male      Information obtained by questionnaire indicates that within one year of LSD exposure the subject experienced a 3-4 week period of "nervous fatigue." This was characterized by the inability to concentrate, complete assigned work, and trembling. As a result of these difficulties the subject lost his job as a commercial artist. Some years later the subject experienced a brief (4-7 days) recurrence of the symptoms. The subject's general medical history includes bronchitis, motion sickness, and non-specific eye trouble. The subject also reported a tendency to be shy or sensitive, a strong dislike for criticism, a tendency to be annoyed by trivial occurrences, and non-specific family and work problems.

CASE #286      year old male who participated in Army chemical warfare experiments in 1958. The subject stated that following his LSD exposure he was completely asymptomatic until one year later when he awoke from sleep and had a hallucination of a distorted soldier that lasted from 10 to 15 minutes. Ten years after this, in 1969, the subject again woke from sleep and hallucinated a platoon of soldiers of different colors in his room.



This hallucination lasted from 10 to 15 minutes. The subject stated that although he has had no further hallucinatory episodes he does feel that his personality has changed somewhat since the LSD exposure and in general he is somewhat more irritable and his mood is somewhat depressed. At the time of his participation in the LSD Follow-up Study the subject was known to have had multiple brain metastases from cancer of the lung. The subject had received irradiation therapy to the head and chest during hospitalization from May to June 1978; also at the time of examination, the subject was taking steroids and anticonvulsants. The subject was not known to have lung cancer prior to his presentation in 1978 with the history of right-sided weakness and expressive aphasia. Other pertinent aspects of the subject's past medical history include congestive heart failure, for which he was taking digoxin, Lasix, potassium chloride, and nitroglycerin. He gave a history of paroxysmal nocturnal dyspnea and of inability to walk one flight of stairs without severe shortness of breath. The subject also stated that since 1969 he had been treated with Quibron for asthma. In 1953, the subject was involved in an automobile accident and suffered a severe concussion remaining unconscious for 3 days. General physical examination showed a hard, fixated mass just below the angle of the left jaw and a similar mass located in the left side along the posterior axillary line. Neurological examination was essentially within normal limits. Laboratory studies showed elevations of serum triglycerides, alkaline phosphatase, LDH, sodium, and chloride. ECG showed non-specific T and ST wave changes. Chest x-ray revealed an ill-defined soft tissue density in the right mid-lung field. A sleep enhanced electroencephalogram showed areas of irregular theta slow activity in the left frontotemporal and the right temporoparietal areas. Ophthalmology consultation showed no abnormalities. ENT evaluation showed an asymptomatic nasoseptal defect and presbycusis. Psychiatric evaluation showed no evidence of any psychiatric disorder.

CASE #288      year old male who was involved in chemical warfare experimentation in 1959. The patient stated that although he returned to a completely normal state within 24 hours of the LSD ingestion, he experienced occasional moments of anxiety when subsequently thinking about the experience. Past medical history included mild hypertension and type IV hyperlipidemia. Physical and neurological examination showed no abnormality. Routine laboratory studies were within normal limits with the exception of elevated serum triglyceride levels. Routine consultations with ENT, Ophthalmology, and Psychiatry Services showed no abnormalities.

CASE #297      year old male employed as a      The subject stated that prior to his LSD exposure he had one brief hallucinatory episode consisting of hearing voices while on a ship in the middle of the Pacific Ocean. The patient participated in LSD testing 6 years later in 1959. The hallucinations induced by LSD were of a completely different character being principally visual and being associated with a loss of



ability to concentrate. Ten years later in 1969 the subject experienced one additional episode of hallucinations during a period of some stress. These hallucinations were auditory and similar to the hallucinations experienced in 1953, not those experienced during the LSD exposure. The subject has otherwise had no significant signs or symptoms which could be related to his LSD experience. Past medical history included hepatitis, leukoplakia, adult onset diabetes requiring insulin therapy, recurrent lipomas, recurrent sinusitis, moderate hearing loss associated with tinnitus, several episodes of pneumonia, occasional unexplained chest pain, peptic ulcer disease, recurrent hemorrhoids, recurrent tension headaches, and kidney stones. The patient was exposed to nuclear radiation in 1974. Physical examination showed moderate obesity and a well-healed surgical scar on the left thorax but was otherwise within normal limits. Neurological examination showed a slight difficulty with calculations which was of questionable significance. Routine laboratory studies were all within normal limits with the exception of a slightly low uric acid level. ENT evaluation confirmed a mild bilateral neurosensory hearing loss. Ophthalmology consultation showed no pathological lesions. Psychiatric evaluation showed no evidence of specific psychiatric disorder although a past history of adult situational maladjustment was noted.

CASE #298      year old male employed as a      Information obtained by questionnaire indicated that subsequent to the subject's participation in LSD testing he has experienced recurrent brief episodes characterized by feelings of unreality. These feelings are described as "a state of suspension where normal functions are continuing around you, but you feel that you are not a part of (them)." The subject stated that these periods have become less frequent as the years have passed and currently occur only two or three times a year. These episodes have never caused the patient any significant discomfort or disability. The other medical information reported by questionnaire did not include specific diagnoses although the patient gave a history of worsening eyesight, difficulty relaxing, and feelings of fatigue.

CASE #320      year old male who participated in chemical warfare experiments in 1958. The subject stated that he has experienced occasional episodes of feeling "withdrawn" which were reminiscent of his LSD experience. During these episodes, the subject occasionally developed moderate paranoid ideation. These episodes were not infrequently associated with heavy alcohol consumption, a practice which the subject began prior to, and continued after, LSD exposure. During his period in the service, the subject received several medals but was also court-martialed three times, once for killing a Korean, and twice for missing bed check. Shortly after retirement from the service in 1968 the subject was admitted to an alcohol rehabilitation center followed by an 18-month course of Antabuse therapy. Other than the episodes of "withdrawal" previously mentioned, the subject



did not feel that LSD exposure has had any effect on his overall health, except possibly for the loss of his right kidney in 1971. Immediately prior to participating in the LSD Follow-up Study the subject was under treatment in an Army medical facility for high blood pressure, arteriosclerotic cardiovascular disease with angina, and continued alcohol abuse. Past history also revealed "jungle rot" (1947) and gonorrhea (1951). The subject sustained occipital head trauma at the age of 12 years with several minutes of unconsciousness. In 1951 he fractured four toes on his right foot and in 1966 sustained a contusion of the left testicle. A high frequency hearing loss secondary to chronic noise exposure was noted prior to discharge from the Army. Physical and neurological examinations showed no remarkable abnormalities. Routine screening laboratory studies were all within normal limits with the exception of the ECG. ECG showed an atrial abnormality, left anterior hemi-block, and a single PVC. Ophthalmology consultation showed no abnormalities. ENT consultation showed a chronic high frequency hearing loss. Urology consultation showed no adverse effects of the subject's previous right nephroureterectomy. Cardiology consultation confirmed moderately severe arteriosclerotic heart disease with angina pectoris. Psychiatric evaluation showed a passive dependent/passive aggressive personality disorder and chronic alcoholism. There also was evidence of a mild organic brain syndrome which was felt to be secondary to alcohol abuse.

CASE #321 The subject is a      year old male currently employed as an      Information obtained by questionnaire indicated that the subject felt there might be a relationship between his LSD exposure and the subsequent development of peptic ulcers and chronic work-related depression. The subject has otherwise experienced no significant illnesses.

CASE #329      year old male participated in Army chemical warfare experiments in 1964. The subject stated that during the chemical warfare experiments an electroencephalogram was performed using a strobe light for visual stimulation. The subject stated that he has had recurrent, spontaneous strobe-like images ever since this experience. Although these images initially occurred as frequently as one per week, they gradually became less frequent and at the present time are quite rare. The subject had one of these episodes 3 weeks prior to participation in the LSD Follow-up Study. Prior to this, the subject had not had a similar episode for 2 years. These episodes have apparently not caused the subject any substantial disability. Other toxic exposures include radiation, smoke, and gas fumes. Past medical history was unremarkable. Physical and neurological examinations were completely within normal limits. Routine laboratory studies showed a slight persistent elevation of serum triglycerides and a left axis deviation on electrocardiography which was thought to be of no significance. Ophthalmology and EEG consultations did not reveal any abnormalities. Psychiatric evaluation suggested an unspecified personality



disorder and habitual excessive drinking (presently resolved). No psychiatric follow-up was recommended.

CASE #337      year old male who participated in chemical warfare experimentation in 1967. The subject stated that while in Vietnam a few years later he experienced one episode of a spontaneous recurrence of the same feelings he had while under LSD. This episode lasted approximately 2 hours before resolving completely. The subject has not had any subsequent symptoms of any kind. The subject gave a history of frequent use of marijuana, cocaine, and heroin. Past medical history included mild hypertension and pericarditis. The subject also received a gunshot wound to the right leg in 1974. General physical and neurological examinations were completely within normal limits. Screening laboratory studies were all within normal limits. ENT, ophthalmology, psychiatry consultations failed to reveal any abnormalities.

CASE #342      year old male currently employed as a      The following information was obtained by questionnaire. In response to the inquiry about any problems related to LSD exposure the patient stated that he has "experienced stiff and sore muscles" and has had "hot spells and felt a great deal of nausea." No further details about these complaints were available. Additional medical information obtained by questionnaire includes a history of hives, hemorrhoids, "nervous exhaustion," and hospitalization in 1973 for a peptic ulcer. There was also a history of high blood pressure currently being treated with diuretic medication.

CASE #347      year old male employed as a      The subject was exposed to LSD in 1966. The subject stated that following his LSD exposure he had frequent recurrent nightmares involving snakes. These nightmares often caused him to awaken in the state of severe anxiety. The subject also stated that he developed a snake phobia and would go to some lengths to avoid even seeing pictures of snakes. In addition, the subject reported a marked increase of alcohol intake subsequent to his LSD exposure. The subject stated that while drinking he experiences a change in his personality consisting of ideas of being somewhat unusual and having special powers as well as feelings of general unreality. The subject stated that on some occasions he has blacked out while drinking and has been amnesic for his subsequent behavior. In recent years the subject's alcohol intake has diminished somewhat. Despite the preceding symptoms the subject has been quite successful in his career as a police officer. The subject's past medical history includes blunt trauma to the abdomen resulting in internal hemorrhaging and necessitating blood transfusion. The subject also has a history of a hyperpigmented maculopapular rash on his lower extremities. The subject also reported a peculiar recurrent "fizzing" noise in the posterior portion of his head which has been intermittently present for the past 5 years. This fizzing sensation has never been associated with any other neurological difficulties and evaluation has not



disclosed any significant pathology. The subject has a history of occasional marijuana use. Physical examination revealed mild obesity, moderately elevated blood pressure, and a scaly maculopapular rash on both lower extremities. Neurological examination disclosed fine rapid tremor involving both upper extremities with a slight increase in amplitude on finger to nose maneuvers. Laboratory examinations were all within normal limits with the exception of a borderline evaluation of uric acid. Ophthalmology consultation revealed early mild ocular hypertension. Fundus photographs were obtained to be used for further follow-up. Psychiatric evaluation showed a possible traumatic neurosis (as described above) and habitual excessive drinking. It was suggested that the patient consider entering an alcohol rehabilitation program at a treatment facility near his home.

CASE #349      year old male retired Army officer who received LSD in 1960. One year following his LSD exposure the subject had a grand mal seizure. Neurological evaluation at that time showed abnormal electrical activity over the right temporal lobe but further studies ruled out surgically correctable lesions. Over the next several years the subject continued to have frequent seizures of both grand mal and psychomotor types. Because of difficulty adjusting to his disability, the subject required psychiatric treatment. The subject reported a family history of seizure disorder. (one uncle with post-traumatic epilepsy) but no other neurological diseases. Past medical information included a history of cardiac conduction defect, hepatitis, surgery to the left knee, and splenectomy. In 1967 the subject was advised by a physician not to attempt to have further children because of his exposure to LSD. Physical examination was unremarkable with the exception of mild signs of cerebellar dysfunction in both left extremities. Routine laboratory studies were entirely within normal limits with the exception of electrocardiography which confirmed the previously reported cardiac condition defect. Analysis of seminal fluid showed no abnormalities. Electroencephalography with sleep and photic activation was obtained on two separate occasions and was normal both times. Neuropsychological testing showed superior intelligence with a suggestion of questionable right hemispheric dysfunction because of a discrepancy between verbal and performance IQ. Psychiatric evaluation revealed an obsessive compulsive personality with depressive features.

CASE #355      year old male employed as an      Information obtained by questionnaire revealed that 2 years after LSD exposure the subject experienced "severe mental depression." This culminated in an unsuccessful suicide attempt. With appropriate therapy the subject's depression gradually resolved and he has experienced no recurrence of these symptoms. The subject stated that he is not certain whether or not there was any relationship between his LSD exposure and the development of severe depression 2 years later. The subject's past medical history as reported in the questionnaire was unremarkable with the exception of removal of a herniated intervertebral disc in 1976.



CASE #358      year old male employed as a      The subject reported by questionnaire one flashback episode described as a "recurrence of my LSD experience" about 3 weeks after the initial LSD exposure. General medical information obtained by questionnaire included a history of chronic essential hypertension for which the patient is presently receiving medications.

CASE #376      year old male employed as a      The subject stated that 2 days after participating in LSD testing at Edgewood Arsenal (1958) he went to a nearby town and had "a couple of beers" after which he became disorderly and woke up naked in jail. The subject stated that his behavior was unusual for him and that he was unable to remember the details of the incidents leading to his arrest. Following return to duty, the subject experienced no further similar problems. However, the subject feels that over the years since the LSD testing he has undergone a mild personality change becoming less extroverted and more withdrawn. General medical information obtained at the time of examination included a history of appendectomy, resection of a herniated intervertebral disc and chronic essential hypertension for which the patient was being treated with hydrodiuril, apresoline and propranolol. Physical examination revealed elevated blood pressure (166/94), exogenous obesity, evidence of obstructive pulmonary disease, and mild extensor weakness in the left lower extremity attributed to the previously noted history of a herniated intervertebral disc. Obstructive pulmonary disease was previously unsuspected and further evaluation was obtained from the hospital Pulmonary Service. Pulmonary function testing confirmed a mild, obstructive ventilatory defect probably secondary to chronic smoking. The subject was also advised to consult his civilian physician about discontinuing one of his antihypertensive medications which is known to aggravate obstructive pulmonary disease. During hospitalization the Dermatology Service also saw the subject in consultation and recommended appropriate treatment for moderate hyperkeratosis of the skin and the knuckles.

CASE #377      year old male who participated in chemical warfare experiments in 1960. This subject reported that for several years after his exposure to LSD he had occasional nightmares that he was going insane due to the drug and would have to go to an asylum permanently. These nightmares have not occurred in recent years. The subject also admitted the suspicion that he was passed over for a War College appointment because of his having volunteered for LSD experiments. Past medical history included repair of a hydrocele in 1977, a shoulder dislocation in childhood and a motor vehicle accident in Bulgaria a few years prior to this evaluation. There was also a history of multiple "fatty tumors" on his back which are not symptomatic and have required no specific treatment. Physical examination showed multiple small cystic lesions over the back but was otherwise within normal limits. Neurological examination was completely unremarkable. Routine screening studies at the time of admission were within normal limits



with the exception of a borderline elevation of serum cholesterol. ENT examination revealed a neurosensory high frequency hearing loss secondary to noise exposure. Ophthalmology and psychiatry consultations showed no abnormalities. Neurology consultation showed no problems secondary to the prior hydrocelectomy. General Surgery Service was consulted for evaluation of the "fatty tumors." It was felt that the tumors represented epidermal inclusion cysts and that no treatment was necessary.

CASE #405      year old male who participated in LSD experimentation in 1957. The subject reported that within 1 to 3 weeks after returning to his normal duty station following LSD exposure he experienced a few episodes of feeling "isolated." The sensation was reminiscent of his LSD experience. One month following his discharge from the Army in 1958 he experienced the abrupt onset of feelings of intense isolation followed by visual hallucinations and panic. Shortly afterwards the patient passed out. Subsequently the patient has had numerous similar episodes, the last of which occurred approximately 8 months prior to his participation in the LSD Follow-up Study. The subject reported that each year since 1957 he has had three to four "mild flashbacks" and one "severe" flashback. These flashback episodes typically last from a few seconds to 15 minutes. The subject stated that he has never hurt himself or others during these attacks. There is a questionable history of occasional convulsive activity consisting of either severe trembling or jerking of the extremities. However, the subject has never experienced any seizure aura, bladder or bowel incontinence, versive head or eye movements, or significant postictal confusion. The subject was at one time treated with Dilantin with some improvement in his condition. Immediately prior to being evaluated by the LSD Follow-up Study the patient was placed on thorazine by his regular physician. This has resulted in sexual impotence. Additional past medical history included a herniated intervertebral disc in 1964. Although the patient underwent surgical resection of the herniated disc, he has remained disabled and unable to work for the past 8 years. Physical examination showed borderline high blood pressure. Neurological examination showed a non-anatomical sensory defect involving the entire right lower extremity from the groin to the toes. Sensory deficits were present in all modalities including pain, vibration, pressure, and touch. Nevertheless, the muscle stretch reflexes in the right lower extremity were completely normal. The subject refused to cooperate with muscle strength testing out of concern for exacerbation of residual pain. Laboratory evaluation was completely within normal limits with the exception of an abnormal ECG. Neuropsychological testing showed borderline abnormalities of both cerebral hemispheres. Psychiatric interview revealed a moderately severe depressive neurosis and anti-depressant medications were recommended. Because of the finding of an abnormal ECG, a vector cardiogram was scheduled; however, before this test could be obtained the patient left the hospital due to the sudden illness of one of his children.



CASE #406      year old male currently employed as a      The subject stated that one year subsequent to his LSD exposure in 1959 he experienced the onset of feelings of severe distortion of reality. He was hospitalized for approximately one week and treated with tranquilizing medications. At the time of discharge from this hospitalization the diagnosis was acute paranoid state manifested by a self-limited psychotic episode. He now believes that this episode was related to his previous exposure to LSD but admitted being under extreme work-related stress immediately prior to hospitalization. The past medical history was otherwise unremarkable and the physical examination completely within normal limits. Screening laboratory studies revealed no significant abnormalities.

CASE #408      year old male currently employed as a      Information obtained by questionnaire indicated that for the first 6 months following his exposure to LSD the subject experienced almost daily headaches. Subsequent to that time these headaches have gradually diminished in frequency but still occur. These headaches have occasionally forced the patient to take some time off from work but have not otherwise caused any significant disability. Other medical information obtained by questionnaire includes a history of hernia, hemorrhoids, and complaints of worsening eyesight, constipation, aching muscles, non-specific skin problems, and occasional faintness.

CASE #428      year old male who participated in chemical warfare experiments in 1961 and 1962. The subject stated that within 48 hours of the initial drug exposure he had returned to complete normalcy with the exception of mild photophobia which has persisted to the present time. Past medical history showed five hospitalizations for smoke inhalation and heat exposure (the subject is currently a firefighter) and the removal of an undescended left testicle in 1962. Physical examination showed no significant abnormalities. Neurological examination was within normal limits. Screening laboratory studies showed borderline elevations of CO<sub>2</sub>, SGPT, LDH, and triglycerides. On repeat examination all these abnormalities had resolved with the exception of the CO<sub>2</sub>. The remainder of the laboratory examinations were within normal limits. Psychiatry and ENT consultations showed no abnormalities. Ophthalmology consultations showed a congenital embryonic cataract. It was also noted that photophobia is a common complaint in persons with very light complexions and blue irises such as the patient.

CASE #432      year old male who participated in the chemical warfare experimentations in 1958. The subject stated that for about one week following his LSD exposure he experienced a number of "flashbacks." He also stated that he has had recurrent "bad feelings" and great general concern over having been exposed to LSD inasmuch as he is strongly opposed to taking drugs in general. In addition, the subject stated that even until the present time he has occasionally experienced some "strange episodes"



which are characterized by sensation of sudden enlargement of his head. These episodes are somewhat reminiscent of his LSD experience. Other encounters with toxic chemicals include exposure to phosgene and chlorine gases prior to the LSD experiments. Past medical history included several hernia operations, a repair of the spermatic cord, and a transurethral prostatectomy in 1970. Since that time, he has had multiple urinary difficulties including gross hematuria, retrograde ejaculation, and recurrent bladder infection. Physical examination was unremarkable with the exception of marked enlargement of the prostate with mild tenderness. Neurological examination was within normal limits. Laboratory screening studies were all within normal limits. No abnormalities were revealed by consultations with ENT, Ophthalmology, and Psychiatry Services.

CASE #442      year old male who is presently a      Information obtained by questionnaire indicated that "several times" after drinking alcohol the subject blacked out and carried on activities for which he subsequently had no memory. During one of these occasions the subject reported shooting another person in the leg. The subject reported that shortly after his exposure to LSD he was reduced in grade and charged with inefficiency by his commander. The subject stated that while exposure to LSD may have caused some of his problems, he believes that racial prejudice was a more important factor. Past medical history reported by questionnaire includes eye infections, hernia, episode of severe stomach pain and vomiting blood in 1965, prostate trouble, and venereal disease. The subject's family history is of interest in that his father is reported to have had a "nervous breakdown."

CASE #445      year old male who participated in chemical warfare experiments in 1963. Information obtained by questionnaire indicated that following discharge from the Army in 1965 the subject started experiencing severe allergy problems as well as recurrent heartburn and indigestion. The subject stated, since he had neither allergies nor gastrointestinal problems prior to participating in the chemical warfare experiments, he attributed the sudden onset of his problems in 1965 to those experiments. The subject also stated that one of his children has severe kidney problems of unknown etiology and characterized by pain and hematuria. It is not known whether this child was born prior to or subsequent to chemical warfare experimentation. The subject gave a past history of hives and rashes, hemorrhoids, and kidney trouble.

CASE #458      year old male employed as a      and      . The subject stated that for 4 years from the time of his LSD exposure in 1967 he experienced numerous "flashback" episodes characterized by the spontaneous occurrence of feelings of apprehension, anxiety, and unreality frequently associated with visual and auditory distortions. Many of these episodes were apparently triggered by environmental noise and the subject stated



that as a result he became very sensitive to noises, afraid to drive his car, developed insomnia and depression and had a marked decrease in libido. The patient also became very afraid of dying. At about the same time the subject began to experience moderate photophobia which, unlike the flashback episodes, has persisted to the present time. The subject's past medical history is otherwise unremarkable except for a history of recurrent muscle tension headaches and a hiatal hernia. Physical examination was completely unremarkable with the exception of moderate obesity. Psychiatric consultation showed no evidence at the present time of any psychiatric disorder. Ophthalmology consultation showed no evidence of any ocular pathology. ENT consultation showed the presence of a previously unsuspected nasopharyngeal mass. Initial diagnostic work-up was undertaken with lateral sinus series and tomograms of the suspicious area. Arrangements were then made for definitive work-up to be undertaken at a Veterans Administration Hospital near the subject's residence.

CASE #478      year old male employed as a      The subject stated that following his exposure to LSD in 1958 he experienced feelings of non-specific anxiety and depression which persisted until 1963 at which time he received psychiatric therapy. The patient states that subsequent to 1963 he has had similar feelings of anxiety and depression associated with smoking marijuana. In addition, while smoking marijuana he has occasionally noted visual distortions and a feeling of panic somewhat reminiscent of his LSD exposure in 1958. The subject's past medical history includes migraine headaches ("common" type), intermittent low back pain, calcific bursitis in both shoulders, iron deficiency anemia, a traumatic nasal septal deformity, and a concussion secondary to motor vehicle accident in 1967. Exposures to toxic chemicals include benzene, carbon tetrachloride, epoxy, fiberglass, mercury, microwave radiation, pesticides, trichlor solvents, radioactivity, and plastics. Physical examination was unremarkable with the exception of the presence of small osteomas in both external auditory canals confirmed as benign by ENT consultation. Laboratory studies including electrocardiography and electroencephalography were all within normal limits. Psychiatric and ophthalmological consultations showed no evidence of any significant disorders.

CASE #481      year old male presently      The subject stated that as a result of his exposure to LSD while in the Army he became a polydrug abuser with a particular preference for hallucinogens including LSD, mescaline, peyote and others. The subject's drug abuse has continued to the present time. Additional past medical history includes non-specific urethritis and rare, intermittent headaches. Physical examination was unremarkable with the exception of an asymptomatic nasal septal deformity. Laboratory evaluation was likewise unremarkable with the exception of the finding of a previously undiagnosed trichomonas infection on urinalysis. Psychiatric evaluation disclosed that the patient's difficulties with socialization had been part of a lifelong pattern beginning in childhood



and manifested by turbulent family relationships, poor educational performance, and a history of difficulty with social interaction.

CASE #487      year old male with a college degree employed as a  
Information obtained by a questionnaire and by telephone contact indicated that for 2 years following LSD exposure in 1965, the patient experienced frequent nuchal-occipital headaches described as a feeling of pressure or tension lasting for several hours and unaccompanied by other neurological signs or symptoms. These headaches became progressively less frequent and had resolved completely within 2 years of the LSD exposure. The subject is currently under treatment for chronic essential hypertension and an arthritic condition involving the right elbow. Other medical history included hemorrhoids, adult-onset mumps, and appendicitis. There is no history of specific neurological or psychiatric illness and the subject has not experienced any problems other than headaches that he can relate to his LSD exposure.

CASE #491      49-year old male employed as a  
Information obtained by questionnaire and by telephone interview indicated that one week after LSD exposure the subject suffered from complaints of excessive fatigue and "dream-like dizzy spells" that were vaguely reminiscent of the LSD experience. He was treated with bedrest and vitamin supplementation and these symptoms rapidly resolved. Two years later while on duty in the Republic of Vietnam the patient again experienced occasional "dizzy" or "light-headed" sensations during times of extreme tension. Following his tour of duty in the Republic of Vietnam, these spells resolved until 1970 when they returned briefly while the subject was stationed in West Germany. As was the case in Vietnam, the dizzy spells were associated with periods of stress. Since 1970, the subject has had only very rare episodes of light-headedness and has had no other signs or symptoms whatsoever that he can relate to his LSD exposure. The subject is otherwise in good health and on no medications. There is a past medical history of malaria and pneumonia.

CASE #506      year old male who participated in chemical warfare experimentation in 1958. Information obtained both by questionnaire and by telephone communication indicated that following his participation in chemical warfare experiments the subject has experienced 3 or 4 episodes of a "feeling of not caring." This sensation was reminiscent of the subject's LSD experiences. The first of these episodes occurred within 3 years of the initial chemical warfare experiments and the last episode occurred in 1972. These episodes typically lasted for several hours before resolving completely. The subject has never experienced any particular disability from these episodes. There was a past history of chronic essential hypertension. In addition, the subject stated that he frequently was nervous with strangers, had difficulty making decisions, was irritable, and had some difficulty with lack of concentration or memory.



CASE #544      year old male who indicated by questionnaire and by telephone interview that since approximately the time of LSD exposure the patient has experienced occasional vague episodes of difficulty in concentration. The patient is unsure of whether or not these episodes may be related to his LSD exposure and he has experienced no other problems or difficulties of any type referable to that exposure.

CASE #546      year old male who participated in chemical warfare experiments in 1959. This subject stated that within the first few weeks of LSD exposure he experienced occasional lapses of orientation which he felt were probably flashbacks. The subject has never experienced any other phenomena which he can relate to LSD exposure. Although the subject has not been exposed to any other toxic chemicals, he has used marijuana on at least one occasion. Past medical history was unremarkable with the exception of the excision of small skin cancer in 1974 and 1978. Physical examination was completely unremarkable with the exception of small patches of psoriasis noted on the scalp. Neurological examination showed no significant abnormalities. Screening laboratory studies were all within normal limits with the exception of borderline elevation of potassium and LDH. ENT, ophthalmology, and psychiatry consultations showed no abnormalities.

CASE #552 The subject is a      year old male who was medically retired from the Army because of severe arteriosclerotic heart disease. The subject has a history of habitual excessive drinking (to a maximum of one-fifth daily) until about 1973 at which time the patient completely discontinued alcohol intake. On one occasion in 1973, approximately 12 hours after the intramuscular injection of antibiotic and about 24 hours after his last drink, the patient experienced vivid visual and auditory hallucinations of a persecutory nature. Since receiving notification of the LSD Follow-up Study, the subject has become concerned that these hallucinations may have been related to his LSD exposure in 1958 rather than acute alcohol withdrawal. However, the subject has never experienced any other signs or symptoms referable to his LSD exposure. The subject's past medical history revealed hospitalization, in October 1973, for acute alcoholic hepatitis. The subject also has a history of chronic essential hypertension and chronic obstructive pulmonary disease secondary to excessive cigarette smoking. Also reported were peptic ulcer disease, hemorrhoids, bilateral inguinal hernias, and recurrent throbbing headaches. Physical examination showed a moderately obese chronically ill appearing male who was somewhat short of breath throughout the examination. There was evidence of generalized arteriosclerosis including arteriopathic changes in the retinal vessels and diminished peripheral pulses. Pulmonary examination showed an increased chest diameter with hyperresonance to percussion and decreased breath sounds. Neurological examination showed signs of mild organic brain syndrome including difficulty with calculations, abnormal handwriting, and finger agnosia. The remainder of the neurological examination was unremarkable with the exception of a vague decrease in all



modalities and sensation over the entire left side of the body. Complete blood count showed an increased hematocrit attributed to secondary polycythemia from chronic obstructive pulmonary disease. Serum chemistries were within normal limits with the exception of a mild elevation of uric acid attributed to chronic use of thiazide diuretics. The remainder of the laboratory studies, including ECG, chest film, and EEG were basically within normal limits. Neuropsychological evaluation was suggestive of moderate impairment of dominant hemisphere function. ENT evaluation showed no evidence of psychiatric disease other than a history of habitual excessive use of alcohol.

CASE #555      year old male who participated in chemical warfare experiments in 1958. The subject stated that following his participation in chemical warfare experiments he developed a "nervous condition" and became "aloof" from his family. The subject also felt that he became somewhat forgetful. Past medical history revealed moderate anxiety characterized by frequent headaches and the use of tranquilizing medications. The subject has had increased difficulty with hearing and tinnitus. He also described recurrent chest pains or tightness which had their onset approximately 1 year prior to participation in the LSD Follow-up Study. There was a history of possible peptic ulcer disease and colitis. Physical examination showed an opaque and retracted left tympanic membrane and an absent left dorsalis pedis pulse. Neurological examination showed some difficulty with serial subtraction and difficulties with respect to some cortical sensory modalities including double simultaneous stimulation, graphesthesia, and stereognosis. Laboratory studies showed mild elevations of serum SGPT and triglycerides which resolved on repeat examinations. Because of the history of the death from congenital heart disease and craniosynostosis of a child born in 1965, chromosome analysis was obtained and no abnormalities were found. The subject also has seven other children all of whom were born prior to his participation in chemical warfare experimentation, and all of whom are in good health. ENT consultations showed a bilateral high frequency hearing loss and chronic scarring at both tympanic membranes. Ophthalmology consultation showed presbyopia and scattered opacities of the lenses, both changes which were considered normal for the subject's age. Dermatology consultation showed "knuckle pads" of unknown etiology for which no therapy was indicated. Psychiatry consultation showed involuntary melancholia, manifested by severe tension, somatization, early morning awakening, feelings of guilt, decreased libido, fatigue, and emotional withdrawal from his family. Further therapy was recommended.

CASE #563      year old male who participated in chemical warfare experimentation in 1956. Information obtained by questionnaire indicated that approximately 18 months from his participation in chemical warfare experiments, the subject experienced a single episode of visual distortions



and a feeling of jamais vu (unfamiliarity with the surroundings). The subject has experienced no subsequent signs or symptoms of any kind referable to LSD exposure. The subject reported that he is in overall good health with the exception of arthritis in the neck and left shoulder. The subject also reported being an excessive smoker and "less than moderate drinker."

CASE #564      year old male      The subject received LSD on three separate occasions during the period from mid-1957 to late 1958. After each LSD exposure the subject experienced sexual impotence of 1 to 4 weeks' duration. The subject has never experienced any other symptoms referable to LSD exposure. The past medical history obtained during hospitalization includes chronic excessive alcohol intake resulting in mild liver dysfunction discovered in 1978. The subject also reported moderate nervousness and anxiety related to family and employment pressures. Physical examination was unremarkable with the exception of evidence of peripheral polyneuropathy, probably secondary to alcohol abuse, and chondromalacia of the right patella. Laboratory evaluation showed a mild elevation of liver enzymes consistent with the reported history of alcohol-induced liver dysfunction. Psychiatric consultation revealed, in addition to the history of alcohol abuse, depressive neurosis secondary to multiple stresses. The subject also underwent evaluation by the Pulmonary Service because of complaints of shortness of breath and was found to have evidence of mild small airway obstruction secondary to chronic cigar smoking.

CASE #572      year old male employed as a      The subject was exposed to LSD in 1957. In 1959 the patient had a brief "flashback" which consisted of several minutes of visual hallucinations. These consisted of images of lions and tigers approaching him through a window. Otherwise the patient has experienced no problems of any sort which he can attribute to his LSD exposure. In 1967, the patient underwent hypnotic therapy for episodes of spontaneous crying which were apparently related to an incident which occurred while the subject was on duty in Vietnam. The subject is otherwise in overall good health and his past medical history is remarkable only in that he admits to the occasional use of marijuana. The only significant abnormality uncovered during hospitalization was a mild bilateral high frequency neurosensory hearing loss.

CASE #596      year old male who participated in chemical warfare experimentation in 1960. The subject reported that during his acute LSD intoxication he was handed a salt shaker which caused him to become severely frightened. He also noted that during the LSD experiments he was given a number of psychological tests and due to the effects of the drug was indecisive and immobilized. The subject stated that following his exposure to LSD he developed an unreasoning saltshaker phobia. In addition, he developed feelings of panic and severe indecisiveness when required to make an emotionally charged decision. Both of these phenomena have continued to the present time, although becoming somewhat less severe in intensity over



the intervening years. The subject also described developing some "paranoid thoughts" while smoking marijuana in 1974. He describes these feelings as also being similar to some of those which he experienced while under LSD. Past medical history included a number of significant medical conditions. The most potentially harmful of these was a history of recurrent episodes of pericarditis of unknown etiology. The first attack of pericarditis occurred in 1952, the second in 1964, and the most recent in 1974. In addition, the subject has had angina pectoris and a cardiac arrhythmia associated with these recurrent bouts of pericarditis. The subject also has a history of chronic essential hypertension requiring antihypertensive medications and a history of an episode of infectious hepatitis in 1945 and tuberculosis exposure in 1956. The subject underwent surgery in 1940 for the repair of a ventral hernia and simultaneous appendectomy and in 1959 was operated on for the removal of a cecal polyp. The subject also gave a history of recurrent joint and rib pain and a burning sensation in the upper anterolateral portion of the right thigh. In recent years, the subject has experienced decreased libido associated with impotence. Physical examination was unremarkable with the exception of several well-healed scars and several skin lesions consisting of small sebaceous cysts, pedunculated fibromata, small seborrheic plaques, and hyperemic perifolliculitis. A mucopurulent discharge was also noted in the right external auditory canal and rectal examination showed small external hemorrhoids. Neurological examination was unremarkable with the exception of decreased auditory acuity. Laboratory evaluation showed a mild leukocytosis, probably secondary to otitis externa. Serum chemistries showed a slight elevation of uric acid, borderline elevation of cholesterol, and borderline elevation of LDH. Electrocardiography at the time of admission showed an anteroseptal myocardial infarction of indeterminant age, left anterior hemiblock, non-specific ST-T wave changes, and left atrial enlargement. ENT consultation showed moderately severe bilateral high frequency hearing loss and otitis externa of the right ear. Ophthalmology consultation showed bilateral early nucleosclerosis and constrictive changes of the retinal vessels probably secondary to chronic hypertension. Psychiatric consultation revealed recurrent episodes of anxiety, apparently related to experiences during Army LSD testing, manifested by irrational fear of salt-shakers and panic and indecisiveness when faced with emotionally charged decisions. At the time of evaluation the patient had no significant psychiatric dysfunction.

CASE #599      year old retired male      This subject reported by questionnaire that he had had intermittent inner ear problems over the past several years resulting in sensations "essentially the same as while under the influence of LSD." Otherwise, the subject reports general good health with the exception of some gradual decrease in visual acuity and recurrent sinusitis.



CASE #627      year old male      The subject was exposed to LSD in 1958. Subsequent to LSD experience he claims to have undergone a personality change characterized by a general loss of interest in his work and episodes of unaccountable rage. From 1958 through 1965 the subject reported a series of dissociative episodes in which he would carry out complex, sometimes violent, behavior for which he later claimed to have no memory. For example, in one episode the subject reported finding himself partially disrobed and dancing on a table in a bar with no memory of how he got there. In 1960 the subject was reduced in rank because of his aberrant behavior. In 1970, the subject's first marriage ended in divorce. The subject attributed his marital difficulties in large part to his personality change subsequent to LSD exposure. From 1965 until the present time the subject has had no further dissociative episodes and no other difficulties specifically related to LSD exposure. There was a history of poliomyelitis in childhood and a history of chronic recurrent muscle tension headaches in adulthood. In 1976 the subject underwent surgery for the removal of a tumor of the thoracic spinal cord which proved to be a meningioma. He made a full and uneventful recovery. The subject has a history of slowly progressive hearing loss for the past 10 to 15 years. With one exception of his participation in the chemical warfare experiments, the subject denies any other contact with hallucinogens, amphetamines, opiates, or other psychoactive drugs. However, there is a history of exposure to numerous toxic substances including foundry dust, carbon tetrachloride, radioactivity, trichlor solvents, and plastics. Physical examination of the patient was unremarkable with the exception of a number of well-healed scars from previous surgery and an indurated left spermatic cord secondary to vasectomy in 1975. Mental status examination showed the patient to be hostile and uncooperative with marked paranoid ideation, a posture maintained to a greater or lesser degree throughout hospitalization. Laboratory studies were all normal with the exception of finding a mildly elevated lactic acid dehydrogenase (LDH) and bacteruria. Neither finding appeared to be of any clinical significance and a repeat urinalysis was normal. ENT consultation confirmed a chronic bilateral neural sensory hearing loss probably secondary to noise exposure. Neuropsychological examination was of questionable validity due to the patient's refusal to cooperate with the testing procedures.

CASE #649      year old male who participated in LSD testing at Edgewood Arsenal in Maryland in 1957. The subject stated that subsequent to receiving chemical warfare agents he began to experience recurrent visual hallucinations and severe inability to concentrate. The subject stated that he has had one to three visual hallucinations weekly for the past 20 years. Since 1961, the subject has had "over 50" different jobs and states that his mental instability caused by exposure to chemical warfare agents has been responsible for his poor work performance. The subject also complained of frequent recurrent episodes of severe fright, hysteria, nervousness, fear of insanity, and fear of death. The subject claimed



not to have been free of these episodes for any significant period of time since his exposure to chemical warfare agents. As a result of these continuing symptoms, the subject has been under periodic psychiatric care and has required psychiatric hospitalization on several occasions, most recently at a VA Hospital near his place of residence in November 1976. The subject participated in the LSU Follow-up Study approximately 3 months after this hospitalization and at the time of evaluation was being treated with Sinequan with some improvement in his symptoms. In addition to the psychiatric complaints, the subject also complained of multiple somatic symptoms including easy fatigability, chronic sinusitis, multiple "moles," shortness of breath, occasional palpitation, recurrent abdominal pain, difficulty with speech, severe headache, and generalized loss of memory. In addition, there was a past history of skull fracture, hepatitis, prostatic hypertrophy, repair of inguinal hernia, and a possible seizure associated with withdrawal from long-term tranquilizer treatment. The general medical examination was unremarkable with the exception of a slight residual hernia sac palpable in the area of the previous herniorrhaphy, small external hemorrhoids, and several small hyperpigmented lesions over the patient's back. Neurological examination was completely within normal limits. Routine laboratory studies were all within normal limits with the exception of a borderline leukocytosis. Electroencephalography was completely normal. Ophthalmology consultation showed no abnormalities. ENT consultation showed a mild bilateral high frequency hearing loss. Dermatology consultation showed seborrheic keratoses and acrochordosis. Both conditions were treated by the dermatology service. Psychiatric consultation revealed a hypochondriacal neurosis, moderately severe, manifested by daily concern with "flashback" experiences, fear of death, fear of having fits, subjective feelings of anxiety, and constant epigastric discomfort. It was the recommendation of the psychiatric consultant that the subject's private physician consider the use of neuroleptic medications and that social case work assistance be obtained if possible.

CASE #680      year old male employed as a      The subject stated that ever since his LSD exposure 18 years ago he has had recurrent episodes of paroxysmal headache, nausea, giddiness, and transient confusion. These episodes generally last 1 to 3 minutes and occur once or twice monthly. The subject has never lost consciousness or displayed any convulsive activity during these episodes; however, he does become briefly confused and generally cannot remember events going on around him during these episodes. The only disability reported as a result of these episodes is minor embarrassment because of his confusion. These episodes have remained completely stable with respect to frequency and duration since the onset 18 years ago. The subject stated that these episodes are triggered by "certain cues" such as certain kinds of music, spoken phrases, and vague memories. The remainder of the subject's past medical history was unremarkable with the exception of one episode of



probable gouty arthritis. There was a family history of alcoholism (father) and mental illness (mother). Physical examination was unremarkable with the exception of a mild bilateral hearing loss. Laboratory studies revealed a slight elevation of uric acid consistent with a previous history of gouty arthritis. Electrocardiography followed by a vector cardiography showed evidence of an old posterior wall myocardial infarction. However, it was the opinion of the examining cardiologist that in view of the patient's complete lack of relevant history this finding was probably a "false positive." Electroencephalography showed no evidence of any underlying seizure activity. Psychiatric consultation showed no evidence of any specific psychiatric disorder. ENT consultation confirmed the clinical impression of the mild bilateral high frequency hearing loss.

CASE #684      year old male who participated in chemical warfare experimentation in 1959. The subject reported having occasional brief distortions of size and depth perception since participating in the chemical warfare experiments. The most recent one of these episodes occurred in 1976. He has experienced no other residual effects or signs or symptoms referable to LSD exposure. The subject's past medical history includes insulin dependent diabetes mellitus since the age of 54. Both the subject's father and the subject's daughter have insulin dependent diabetes. Physical examination was completely within normal limits with the exception of mild varicose veins in the left calf and a small 2 by 3 millimeter pigmented area in the lateral portion of the right eye. Neurological examination was completely within normal limits. Routine laboratory studies were all normal with the exception of a minimally elevated LDH. ENT and psychiatry consultations showed no abnormalities. Ophthalmology consultation showed early cataracts in both eyes, probably secondary to diabetes.

CASE #692 The subject is a      year old male employed as a      . Although the patient had no specific complaints referable to his LSD exposure in 1958, the following statement was made: "Since LSD is a personality drug I feel that I have learned a little about my inner feelings which is not bad but I would rather not have known that young in life."

CASE #703      year old male employed as an      . Information obtained by medical history questionnaire stated that from late 1959 until about 1963 the subject suffered a series of "muscle spasms and problems with nervous system." The subject relates these symptoms to his LSD exposure in 1958. General medical information reported by questionnaire included a history of heart-burn, high blood pressure, decreasing visual acuity, and arthritic pain.

CASE #717      year old male who participated in chemical warfare experimentation in 1958. Twenty-four hours following discharge from the testing area, the subject had a several-hour episode of slurred speech and ataxia, both of which had occurred during his prior LSD ingestion. Over the past



10 years, the subject reported recurrent episodes of jamaïs vu, intermittent confusion, nightmares, decreased ability to concentrate, temper outbursts, suspicious feelings and thoughts, and memory loss. These symptoms have been very variable in frequency but have persisted to the present time. Past medical history included a concussion in 1975 and a 60-pack-year history of cigarette smoking. General physical and neurological examinations were unremarkable. Routine laboratory studies were all within normal limits with the exception of chest x-ray which showed a healed fracture of the left posterior eighth rib. Sutures were also noted near the left hemidiaphragm from previous hiatal hernia surgery. Ophthalmology consultation showed a mild traumatic cataract in the left eye and evidence suggestive of early retinitis pigmentosa. ENT consultation showed a moderate neurosensory hearing loss, probably secondary to noise exposure. Psychiatric consultation showed evidence of a personality disorder, explosive type.

CASE #721 30-year old male employed in the  
During follow-up evaluation the subject stated that as a result of his LSD exposure he felt "more aware" and "less guilty" and, in general, less defensive than prior to his LSD exposure, a change which he considered beneficial. The remainder of his medical history was unremarkable with the exception of a possible skull fracture at the age of 17. Physical examination was unremarkable with the exception of borderline high blood pressure of uncertain significance.

CASE #723      year old male intermittently employed as an  
Evaluation of this subject revealed a history of chronic alcoholism characterized by drinking binges of up to 2 to 3 quarts of hard liquor daily. His alcoholism had caused numerous serious secondary complications including an organic brain syndrome, alcoholic peripheral neuropathy, cerebellar dysfunction, enlargement of the liver, and the skin changes characteristic of chronic alcohol abuse including spider angiomas on the trunk, palmar erythema, and a diffuse yellowish discoloration of the skin. The subject stated that while he could not entirely attribute his abuse of alcohol to LSD that in part his increased use of alcohol followed his LSD exposure in 1958 and that he was "looking for the same good feeling" that he experienced while taking LSD. In addition to the history of severe, chronic alcoholism noted above, the subject's past medical history included multiple colonic polyposis and a partial colonic resection as well as traumatic injury to the left knee with secondary chronic joint pain. The subject also described symptoms of recurrent palpitation, shortness of breath, and ankle edema. Physical examination showed a chronically ill appearing male with the above mentioned secondary signs of alcoholism. In addition, condyloma acuminata were noted perianally and there was moderately severe tinea cruris. Former neuropsychological testing confirmed the clinically diagnosed organic mental impairment and psychiatric evaluation confirmed chronic, severe alcoholism and neurotic depression. Because of the finding of an enlarged liver the patient was referred to the



Gastroenterology Service where further evaluation showed no need for immediate intervention other than urging discontinuation of alcohol intake. ENT evaluation showed a bilateral high frequency hearing loss of the type characteristic of environmental noise exposure. At the time of discharge from the program the subject was advised to seek treatment for his alcohol abuse at an appropriate treatment facility near his home.



## AFTERWORD: MILITARY EXPERIENCE IN PERSPECTIVE

In order to put the Army chemical warfare experimentation with LSD in the proper perspective, it is instructive to briefly review the extent and nature of LSD experimentation in the civilian medical community during the same time period. Rarely has a chemical substance so captivated the imagination and provoked the interest of both the scientific and lay community as did LSD beginning in the early 1950's. According to a review by Hoffer,<sup>8</sup> six reports concerning LSD were published in 1950. That figure rose rapidly each subsequent year until, by 1957, approximately 100 reports were being published annually, a rate which continued unabated until the mid-sixties. In addition, national and international symposiums were held periodically to review research results and suggest new directions to pursue.

Although naturally occurring hallucinogens have been in widespread use since antiquity, none had ever seemed to hold the promise that man-made LSD did for neuropsychiatric research. Investigators initially hoped that LSD might provide a means to an elusive goal: the production of controllable and reversible psychoses under precise experimental conditions. It was hoped that the study of LSD reactions would provide clues to the nature of naturally occurring schizophrenia and other psychotic illnesses. Experimental psychotherapists also looked to LSD for a potent therapeutic tool which could be used to immediately cut through a lifetime's psychological defenses, like Alexander slicing through the Gordian knot.



In theory, at least, the suppressed desires, feelings, and memories released by LSD treatment could then be confronted and dealt with productively.

Although it is difficult and perhaps impossible to estimate the total number of individuals who have received LSD in the course of civilian research from 1950 on, the following figures may serve to give a general idea of the extent of that research. In the Los Angeles area alone, approximately 1,200 persons received LSD from nine different physicians between 1950 and 1961.<sup>4</sup> Eleven of the participants of a 1959 symposium entitled, The Use of LSD in Psychotherapy,<sup>1</sup> estimated that, among them, they had administered 12,150 doses of LSD to 1,100 patients. Even excluding three physicians from the Los Angeles area whose patients were likely included in the 1,200 cases reviewed by McGlothlin and Arnold,<sup>14</sup> the remaining eight physicians administered 9,660 doses of LSD to 870 patients. By combining the reports of 44 different investigators, Cohen (1960) was able to accumulate data on 5,000 subjects given LSD or mescaline either experimentally or therapeutically. More recently, Malleon<sup>16</sup> surveyed physicians in the British Isles and found that 30 respondents reported treating 4,470 subjects with LSD.

As LSD research continued into the sixties, LSD rapidly gained wide notoriety with the lay public. Partially in response to growing controversy over its use and safety, increasingly stricter Federal regulations were imposed upon LSD research. In 1963, LSD acquired "investigational



new drug" (IND) status, requiring that all research programs using LSD comply with specific HEW guidelines. In 1966, Sandoz, the sole legitimate source of LSD in the world, turned its entire stock over to the Public Health Service which set up a joint FDA-PHS committee to supervise all future distribution for research or therapeutic purposes.<sup>3</sup> Eventually, the combination of strident controversy, stifling regulations, and the failure of LSD to live up to much of its early promise in terms of both psychotherapy and research induced many investigators to turn their efforts in other directions.<sup>3,5,18</sup>

Army research with LSD and the civilian research, as outlined above, were roughly contemporaneous. So far as the author can determine from a comparative reading of both civilian and military research projects, similar standards governed both at similar points of time. It is erroneous to believe that Army LSD testing was generally recklessly carried out and in the "cloak and dagger" manner graphically depicted in periodic press reports and in books, such as the recently published The Search for the Manchurian Candidate (March 1978).<sup>17</sup> Virtually all Army LSD experiments carried out on volunteer military personnel were designed by professional researchers and were medically supervised to ensure the safety of the participants. Army LSD subjects were normal, healthy volunteers, the majority of whom were psychologically screened beforehand. Between 30 and 50 per cent of potential subjects were rejected during this screening.<sup>20</sup> On the other hand, civilian research subjects included not only normal healthy volunteers, but also alcoholics, schizophrenics,<sup>2,19</sup>



brain-damaged patients,<sup>11</sup> maximum security prisoners,<sup>2</sup> sexual deviates,<sup>21</sup> and mentally disturbed children.<sup>1</sup> That the standards of human research--both civilian and military--of the fifties and sixties often seem inappropriate today is not necessarily a condemnation of the workers of that era, but is more a tribute to the continuing efforts of the last decade to improve and refine human research standards.

In many respects, the widespread controversy aroused by the comparatively modest amount of LSD experimentation undertaken by the Army Chemical Corps is somewhat puzzling. One explanation might be the issue of the adequacy of informed consent in military LSD research projects. However, a review of the civilian literature of the same period indicated that informed consent--at least as it is currently understood--was by no means universally obtained. Furthermore, it is doubtful whether legitimate informed consent can be given under any circumstances by some of the categories of subjects--mentally ill, brain-damaged, prisoners, and children--which were used in some civilian research projects.

The real crux of the issue, in the author's opinion, concerns the presumed ends to which the Army LSD experiments were carried out (i.e., chemical warfare). The idea of chemical warfare is rightfully abhorrent to most Americans. The horrors attendant on the use of chlorine, phosgene, and mustard gases in World War I were sufficient to induce virtually every nation in the world (except the United States) to ratify the 1925 Geneva protocol on chemical/biological warfare. Oddly enough, despite undoubted antipathy to chemical warfare in a public periodically



jolted by news of accidental leaks of toxic agents from storage depots, it was not until 1975 that the United States formally ratified the Geneva protocol--although, like other signatory governments, reserving the option to use chemical warfare to retaliate against the "first-strike" use of such agents by an enemy.

However repugnant the idea of chemical warfare is in general, it must be admitted that LSD, at the time of its introduction--which, as previously noted, coincided with the height of the cold war--represented a new and unique chemical substance with dramatic potential for warfare application. It would have been grossly negligent of chemical warfare specialists not to have investigated LSD if only from a defensive standpoint. Alternately, it seemed to many Chemical Corps officers (based upon information gained during informal interviews during the LSD follow-up projects) that LSD might eventually prove to be an exceptionally humane weapon: enemy troops temporarily disabled by LSD could be captured essentially unharmed rather than being maimed, crippled, or killed by conventional weaponry.

#### Future Follow-up Studies

As has been repeatedly brought out in the preceding report, a wide variety of chemical warfare agents were used in experiments on volunteer human subjects. It must, therefore, be expected that there will be periodic calls in the future for additional follow-up studies. Already, for example, there is concern about long-term effects of radiation from nuclear weapons testing and about exposure to Agent Orange, a highly



toxic defoliant. Furthermore, in an advertisement in the Washington Post (29 June 1979, page A6), a group titled American Citizens for Honesty in Government (ACHG) called for all individuals exposed to BZ, an extremely potent psychoactive agent, to submit to medical examinations "to determine any lasting effects from the drug."

It should be clear from the preceding report that such undertakings, however well intended, are probably not realistic. Even under ideal circumstances, retrospective studies of adverse drug reactions are difficult to design and their results are subject to differing interpretations.<sup>7,9,10,12</sup> For psychoactive agents, it is almost impossible to select a matched control group that will adequately neutralize nondrug factors.<sup>6,13,14,15</sup> Furthermore, questions of motivation and contamination by exposure to other drugs seriously compromise the reliability of the findings in the exposed subject groups.

The LSD Follow-up Study has demonstrated that thorough clinical evaluations can be organized and carried out--although both costly and time-consuming for systems with limited clinical resources--and may prove extremely beneficial to the individual participants both by alleviating unnecessary concerns and by the serendipitous detection and treatment of previously unrecognized illness unrelated to the question of drug exposure (32 per cent of the subjects in this LSD study thus were benefitted). However, issues of casualty cannot be addressed because of the many unknowns and confounding variables which cannot be compensated for. These limitations, as well as benefits, should be given careful consideration when future follow-up studies of chemical warfare agents are proposed.



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